# Soil Conservation

June 1977

U.S. Department of Agriculture

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# The Plains: A Sense of Urgency

From the Administrator

During droughts, people call it "The Great American Desert" or "Dust Bowl" or a "disaster area."

When there is adequate moisture, it's known as "the breadbasket of the world."

The people who live there call it the Great Plains. Even in good years, it doesn't rain much; normal precipitation is in the 12- to 24-inch range annually, and in drought years, it may fall to 60-75 percent of normal. The fragile soils blow easily when dry and unprotected.

Then why farm the Plains? Because the Plains is located in one of the three great wheat-producing areas of the world, and is perhaps the most dependable of the three. We cannot afford not to farm the Plains; America needs its production and so does much of the world.

But can we grow wheat in the Plains and still protect the soil? The answer is a qualified "yes." Millions of acres there can be farmed without damage to the resources and the environment if proven conservation techniques are followed. Millions of additional acres are better off as grassland, producing needed livestock products instead of unwanted soil and water problems. Many of those acres already have been returned to grass. More should be.

A valuable tool for achieving both goals—applying more soil and water management to farmland and returning "difficult acres" to grassland—is the Great Plains Conservation Program (GPCP). Since 1956, this unique program has made cost-sharing assistance and technical help available through 3- to 10-year contracts with Plains farmers and ranchers.

GPCP helps farmers and ranchers prepare for the inevitable drought so they can keep their resources and their livelihood intact until nominal moisture returns.

For the past 2 years, many parts of the Great Plains once again have suffered severe drought. Producers who have made headway under GPCP contracts survived the drought better. But nearly 8 million acres of land in the Great Plains was damaged by wind erosion this year—up almost 2 million acres over the year before.

This experience should give all Americans a renewed sense of urgency about increasing conservation efforts in the Plains. We cannot afford to let this valuable region blow away; the land and its people mean too much to everyone.

Mel Davis

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Bob Bergland
Secretary of Agriculture

R. M. Davis, Administrator
Soil Conservation Service

Prepared in the Information Division
Soil Conservation Service
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Judith E. Ladd
Editor

Maryellen Bertram
Editorial Assistant

Christopher Lozos
Design Consultant

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Cover:
**Where the soil is not protected on the Great Plains, the hazard of erosion is severe. It can be controlled by contour stripcropping, terracing, and other conservation practices. See pages 4 through 9. (Photo, Gene Alexander.)**

# Soil Conservation

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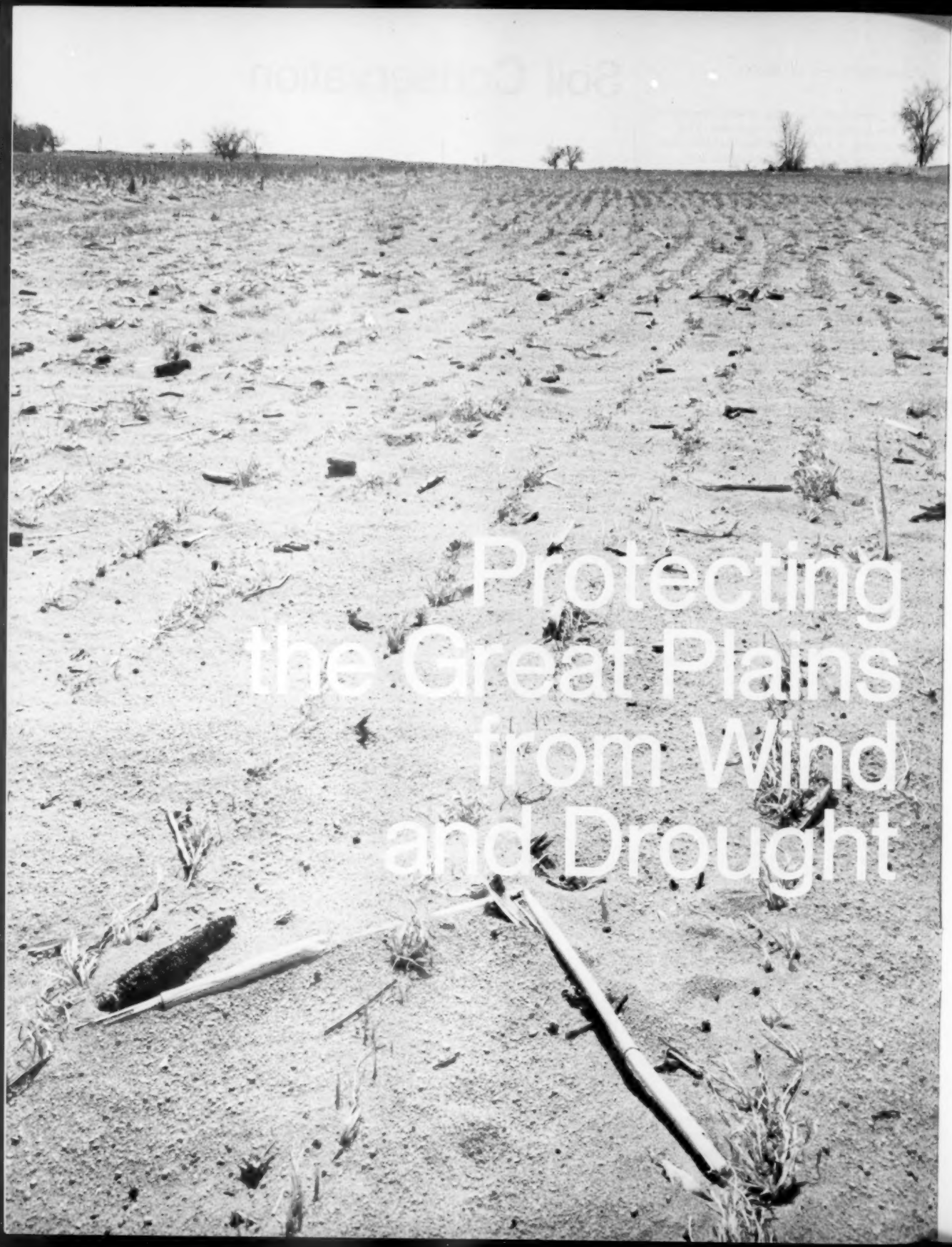

Protecting
the Great Plains
from Wind
and Drought

At left, North Dakota field windbreaks and stripcropping and, below, Nebraska contouring and terracing are conservation practices that help protect Plains soil.

For years farmers and ranchers in the Plains states have been challenged by the climate and soil. Today many are discovering that a "conservation package" brings them closer to a permanent solution for their special problems.

by Barbara L. Maus

A field of wheat in Nebraska shows the challenge of climate and soil that Great Plains farmers and ranchers face.

Many see it as the most beautiful and productive land in the world, while others recall it with personal memories of waste and desolation. It is the Great Plains, a vast, semiarid area that cuts through 10 states—Texas, New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, South Dakota, North Dakota, and Montana—and extends northward into Canada.

It is a place where vagaries of weather have spelled prosperity and disaster. When rain falls, crops and grass grow. When drought and 50-mile-an-hour winds wage war on the land, the soil blows, crops are destroyed, and it may take a farmer more than a decade to recover his losses.

This year marks the 21st anniversary of the Great Plains Conservation Program (GPCP)—an effort aimed at solving problems resulting from drought and the cultivation of land unsuited for sustained crop production.

Conservation districts in the Plains states helped design the program in the early 1950's, and in 1956 it became Public Law 1021. Under the voluntary program, Great Plains farmers and ranchers receive tech-

Below, properly locating water facilities helps distribute grazing to provide better grass cover. Near right, Colorado District Conservationist Donald Barker examines stubble mulching which leaves a protective cover on the soil. Far right, shrub windbreak in this North Dakota wheat field protects the soil and crop from high winds.

nical and financial assistance which enables them to make needed adjustments in land use and to install conservation measures on their land. The program is administered by the Soil Conservation Service through local conservation districts.

James D. Abbott, SCS assistant state conservationist in Texas, was the contracting officer who signed one of the nation's first GPCP contracts on December 18, 1957.

"In those early days," he explained, "our major effort was to encourage the return of unsuitable cropland to grassland. But today our work is much broader in scope. Our aim is to conserve almost all of the natural resources in the region."

To qualify for GPCP cost sharing, farmers and ranchers agree to adopt a "conservation package"—a comprehensive plan for an entire farm or ranch. They may choose from 32 conservation practices in making up their package. An exact schedule is developed, and the landowner then contracts with the Secretary of Agriculture to finish the work within 3 to 10 years.

Farmers and ranchers are helped by SCS technical specialists as the need arises and receive the Federal share of the cost—up to 80 percent—as each conservation practice is completed.

The precision planning is paying big dividends. Each dollar of Federal cost sharing produces nearly $4 of increased annual agricultural income in the Great Plains, according to a 1974 SCS study. In that year the program generated an additional $43.7 million in agricultural income above that which would have been realized had the cost-shared conservation program not existed.

But what does all of this mean in practical, everyday farming and ranching terms? The benefits to the land have been manifold. They include protected and improved cropland, reduced wind and water erosion, improved range, dependable water for livestock, savings in scarce irrigation water, and a more beautiful countryside.

Landowners say the GPCP gives them the means to soften the punch of climatic extremes. Summer temperatures in the Plains are generally high, sometimes exceeding 100 degrees. Precipitation is relatively light, averaging 20 inches a year. When it is lighter than usual, there is drought. Usually some part of the Great Plains is affected by drought every year. During these long, dry periods, millions of acres have been damaged, some severely, by wind erosion.

The result is that many areas cannot be farmed safely, and others can be farmed only with intensive measures to conserve soil and water. The Great Plains Conservation Program is especially tailored to these conservation needs. In the two decades since its inception, farmers and ranchers have applied:

- 2,429,381 acres of permanent vegetative cover.
- 958,486 acres of field and wind stripcropping.
- 169,163 acres of contour stripcropping.
- 1,945,975 acres of reestablished grasslands.
- 41,766 acres of trees or shrubs established as windbreaks.
- 81,195 miles of terraces.
- 5,376,083 acres of brush control.
- 9,044 miles of pipelines to provide water for livestock grazing lands.

The various combinations of cost-share conservation practices have resulted in an estimated soil erosion reduction of 240 million tons annually at a cost of 5.19 cents per ton of soil controlled.

"Farmers and ranchers with GPCP contracts suffer much less when drought comes," said Abbott, "but we're not nearly through with this job. Nearly 200 million acres need conservation treatment in the Plains. Only 94 million acres are now under GPCP contract."

Drought and wind in 1975 and 1976 proved that no conservation program can be perfect. Seven million acres were damaged in the 10 Plains states last year. An additional 10.5 million acres were in condition to blow at planting in the spring of 1977.

Nevertheless, sound conservation practices held the soil down on many farms and ranches. Minimum tillage left a protective cover of stubble on cropland. Windbreaks cut the destructive force of the wind around fields, feedlots, and homesteads. Stripcropping helped keep the land safe. Emergency steps, such as chisel plowing, provided temporary relief from wind erosion.

Though it was bad enough, last year's drought fortunately was not a repeat of the 1950's or 1930's. But it did prove two points: It showed that the combination of soil and climate in the Great Plains continues to challenge conservationists. And it showed that well-planned conservation practices can bring Plains farmers and ranchers nearer to a permanent solution for their special problems. Skillful landowners can defend themselves with just a little help from the Great Plains Conservation Program.

Ms. Maus is editorial assistant, Midwest Technical Service Center, SCS, Lincoln, Nebr.

## Conservation Aids South Dakota Ranchers During Drought

**A study recently completed by the Soil Conservation Service indicates that South Dakota ranchers who participate in the Great Plains Conservation Program are better able to sustain their livestock enterprises during drought.**

**The study, made in response to a request by South Dakota Governor Richard F. Kneip, assesses the effectiveness of the GPCP in 47 drought-stricken counties throughout the state.**

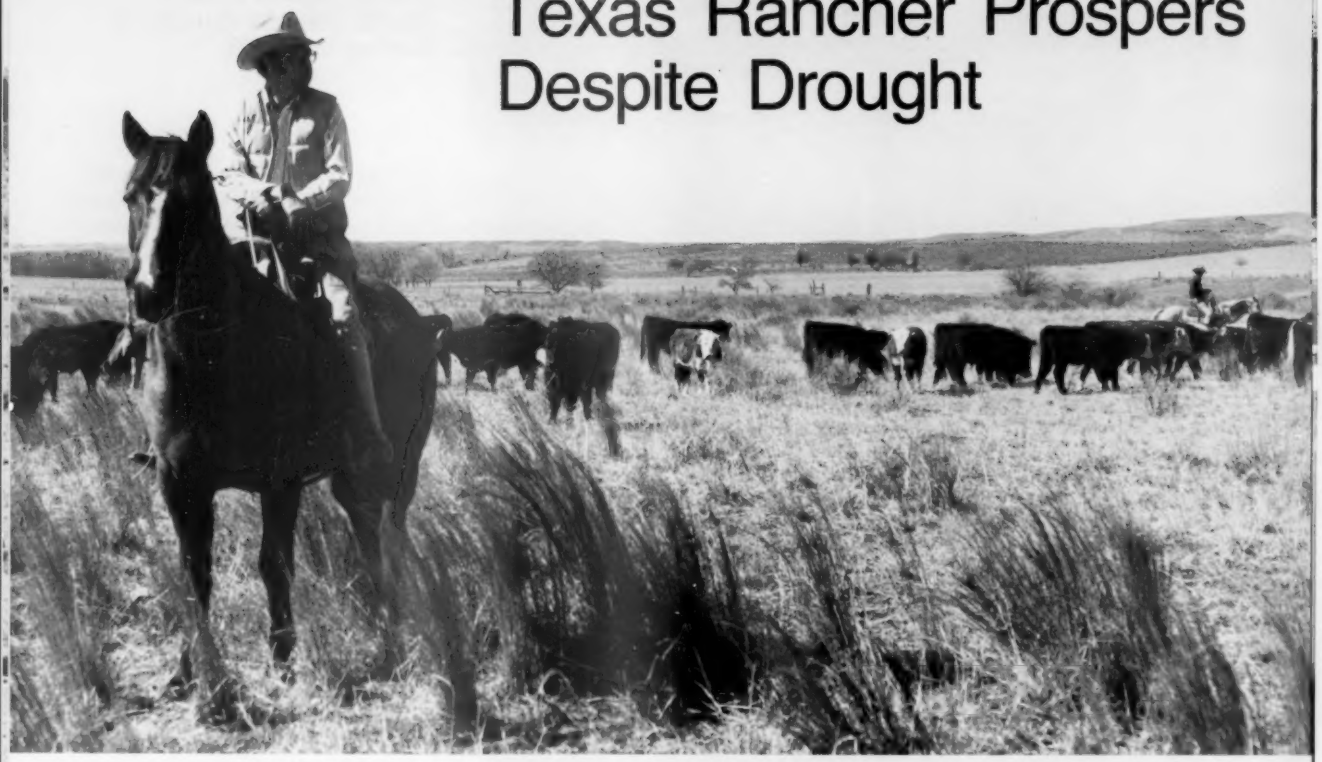
**An analysis of 418 farms and ranches—half with conservation contracts and half without—shows that about 35 percent more of the farmers and ranchers with completed GPCP contracts had adequate hay, pasture, and water supplies than those who did not participate.**

**Among nonparticipants:**

- **41 percent more required emergency pasture.**
- **51 percent more had inadequate hay supplies.**
- **30 percent more required emergency hay.**
- **43 percent more had inadequate water supplies.**
- **10 percent more decreased the size of their livestock herds.**

**The study also reveals that on land not under GPCP contract, 36 percent more acres of grassland are overgrazed, and 38 percent more acres of cropland have moderate to severe wind erosion damage.**

# Texas Rancher Prospers Despite Drought



A Texas rancher's planned grazing system is spelling the difference between success and disaster during drought.

by Shirley Foster Fields

A fellow can get himself painted into a corner in this part of the world if he forgets that flexibility is the key to successful ranching.

Such is the conviction of west Texas rancher Don Powell, whose 750 steer calves near Canadian, Tex., are well watered and fed despite the drought that has besieged this Great Plains state.

Many Plains ranchers have received federally cost-shared shipments of emergency feed to keep their herds alive during this year's drought. Others have received government assistance to help defray the cost of transporting their cattle from drought-stricken regions to areas where grass is in good supply. But Powell has needed no such help. His forage is plentiful, and his cattle don't thirst.

The soils on Powell's 5,500-acre ranch are similar to those on other ranches in the area, and he has received the same scant rainfall as others plagued by drought. Why, then, is he better off than the hundreds of Plains ranchers who have been forced to sell their livestock prematurely, taking heavy losses?

Powell attributes his good fortune to the ranch conservation plan he has followed since 1975 under the Great Plains Conservation Program (GPCP).

The focal point of his plan is grazing management. "I'm careful to reduce or increase the number of steers grazing in a particular pasture—depending on the condition of the forage there," he explains. "When I have the right number of calves grazing at the right time and place, and for the right length of time, my grass maintains its vigor and productivity, and I can forestall a crisis during drought."

The crisis, of course, is grass so damaged by overgrazing that a

rancher must take his cattle off it or risk killing it outright.

"When times are good, we average 22 inches of rain a year here," Powell says. "But in the 6 months from September to March, we had only 2½ inches. So you can see that in a region where fluctuations are so extreme, the fellow who makes a go of it can't leave things to chance."

Powell's grazing system on his 18 pastures is not fixed. In fact, pasture rotation may vary drastically from season to season or year to year. Critical factors are time and amount of rainfall, forage growth, brush spraying, and the sparseness or proliferation of brush.

In the spring of the year, the lusty brush plant shinoak (Quercus harvardi) thrives in west Texas' sandy soils. Its palatable green leaves attract livestock at a time when little else on the range is green. The attraction, however, can be deadly. The plant causes inflammation of the stomach and destruction of the kidneys, and there is no treatment for an animal that has eaten too much. At the first sign of budding, Powell shifts his cattle from the shinoak-infested pastures to pastures of sideoats grama (Bouteloua curtipendula), blue grama (Bouteloua gracilis), or weeping lovegrass (Eragrostis curvula). The next move is usually in July when he shifts the herds to forage sorghum on his croplands.

When rain does fall on Powell's ranch, it is grass, not brush, that benefits.

"Brush control was step number one in my conservation plan," he explains. "As recently as 2 years ago, brush had the upper hand on about half my land. But today I can look out and see native bluestems where sand sagebrush and shinoak used to grow."

Powell sprays the brush with herbicide in May, then lets the treated land rest until frost. Native grasses, such as sideoats grama, indiangrass (Sorghastrum nutans), switchgrass (Panicum virgatum), and bluestems (Andropogon spp.) grow as the brush dies.

"These are the climax species, the natives here. They're making a tremendous comeback. By November, they are well established, and I can return my herds to the renewed acres for grazing until spring."

Rancher Don Powell (left) and SCS District Conservationist Tom Powell discuss the rancher's conservation plan which includes a flexible grazing system and brush control.

Powell has seeded 260 acres of eroded cropland with weeping lovegrass, an introduced species. He will seed another 300 acres this year, and 200 more in 1978. The advantage of weeping lovegrass is that it is ready for grazing earlier than native grasses, allowing him to stop supplemental feeding earlier.

With help from the GPCP and the Salt Fork Soil and Water Conservation District, Powell has made other improvements: 2 miles of crossfencing, two new livestock water wells, and new drinking and water storage facilities that assure his herds an emergency water supply.

Powell signed his GPCP contract in September 1975, and has already completed half of his conservation plan. When the plan is finished—his target date is late 1978—he will have converted 600 acres of wornout, eroded former cropland to permanent pasture; controlled brush on more than a thousand acres; and increased his herd from 750 to 1,000 head.

To date, the total investment in carrying out Powell's GPCP conservation plan has been $16,216, the rancher explains. Half has been paid by GPCP and half by Powell himself.

"It will be another 2 years," he says, "before I achieve what I really want here. Even then by Texas standards, this will be a modest operation."

But, he concedes, when there's reserve water in the storage tanks, when the cattle are well fed, and the land is tied down by grass rather than blowing in the wind, there's something to be said for modesty.

Ms. Fields is a public information officer, Information Division, SCS, Washington, D.C.

Wave erosion on old-style berm is typical of that found in SCS survey when berm was not protected by special plantings.

by Arnold G. Davis

# Roots and Reeds Stop Inland Lake Erosion

Two plants have proved effective in preventing shoreline erosion. They also tolerate high and low water levels.

Two hardy, improved drought-and-water-resistant plant selections made by the Soil Conservation Service prevent erosion of earthen dams in the Great Plains by stopping waves at the water's edge. They are an adaptation of southern switchgrass (Panicum virgatum L.), from Georgewest, Tex., which was originally introduced for range-seeding improvement, and a superior form of common reedgrass (Phragmites communis).

During a survey 8 years ago, SCS discovered wave erosion on the front slopes of many earth-filled dams installed in the Great Plains to reduce flooding. Plant materials specialists and agronomists went to work to find plants that could stand high-water levels and drought conditions.

Included in the plants assembled for trials at the SCS plant materials centers in Knox City, Tex., and Manhattan, Kans., were species that produce massive, fibrous roots and those

At left, common reedgrass grows rapidly, with strong, lateral spreading of new plants.

Below, good stand of combination plantings on a critical berm site includes switchgrass, giant reedgrass, common reedgrass, and indigobush amorpha. Fences keep out grazing animals.

that produce rhizomes—lateral, underground stems—as well as a few shallow-rooted shrubs.

Two plant selections best met the tests: Common reedgrass, which produces numerous rhizomes that spread rapidly; and southern switchgrass, which produces massive, fibrous roots. Common reedgrass will tolerate drought and grow in about a foot of water and, like southern switchgrass, will withstand flooding.

SCS engineers cooperated in the study by modifying the berms or front slopes of the watershed structures, widening them and decreasing the degree of slope. Heavier equipment then could be used for tilling and planting, and there was more space to establish the vegetative cover.

Plantings of the improved selections on the redesigned berms have helped to prevent wave erosion and to protect the front slopes during flooding in more than 100 watershed structures in the Great Plains.

The plantings also saved money. Had mechanical methods like rock riprap been used on the berms, the cost would have been much greater. Additional studies are needed to determine the long-term expense of maintaining the vegetative cover on the smaller, vulnerable watershed structures.

The two plant selections will soon be released for commercial production.

Mr. Davis is plant materials specialist, SCS, Fort Worth, Tex.

A tree planter is used to set common reedgrass plantings in furrow on newly smoothed berm at shoreline.

Ronald McDonnell opens a jackgate, timing irrigation to the minute. Concrete blocks embedded in newly installed turnout prevent erosion by breaking the force of falling water.

# A Low-Salt Diet for the Colorado River

Efficient irrigation systems help farmers in southwestern Arizona conserve water—and reduce the amount of salt in the water that flows across the border into Mexico.

by Chris Williams
and Anne Zack

The Wellton-Mohawk area stretches 46 miles along the Gila River east of Yuma, Ariz. Most of the area is bottomlands of the Gila River. It is bordered by rocky desert mountains—the Mohawks on the east and the Gilas on the west.

Since the 1880's, farmers have made this hot, dry valley an oasis. At first they diverted the Gila River for irrigation. However, the surface water flow proved so erratic that in 1915 they began using ground water. Finally, due to poor water quality and insufficient quantity in the 1950's, farmers diverted Colorado River water to flood irrigate their crops.

Excess irrigation water had to be pumped from the ground to keep the water table from rising so high that it would stunt plant growth. Since the water leached salt from the soil as it seeped through the ground, it was more saline by the time return flows were discharged back into the river.

This water management problem in Wellton-Mohawk and other farming areas in the Colorado River Basin led Mexican officials to complain that Colorado River water reaching Mexico's Morelos Dam was so salty that it was reducing crop yields and limiting the types of crops Mexican farmers could grow.

In 1973, the United States signed an agreement with Mexico to reduce, to a specified level, the salinity of Colorado River water crossing the border.

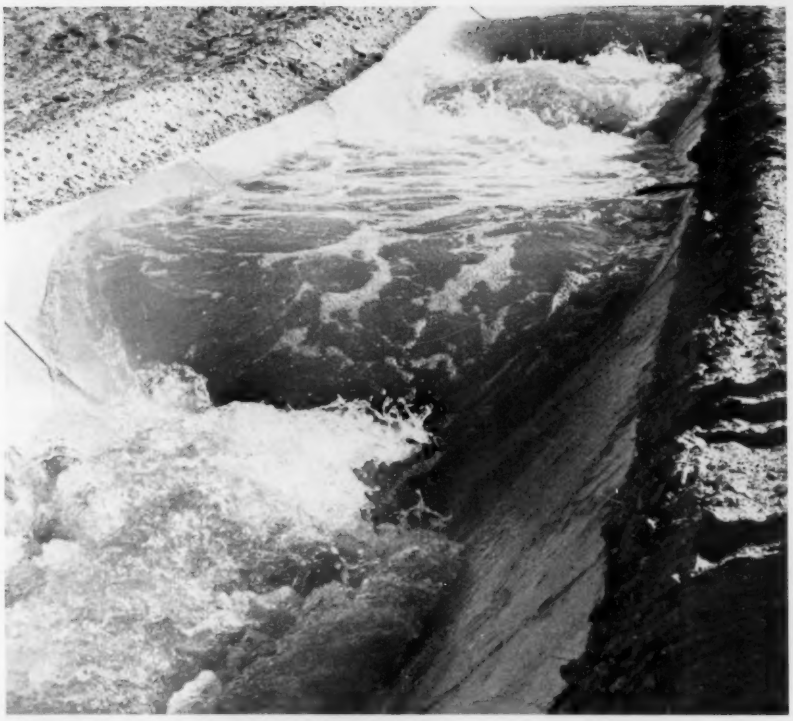
The Soil Conservation Service is helping meet the agreement by conducting an onfarm irrigation improvement project under the Colorado River Basin Salinity Control Program. The project is designed to reduce salty return flows by increasing irrigation efficiency on 23,800 acres of Wellton-Mohawk farmland. In addition to protecting water quality, increasing irrigation efficiency conserves water by cutting the amount wasted.

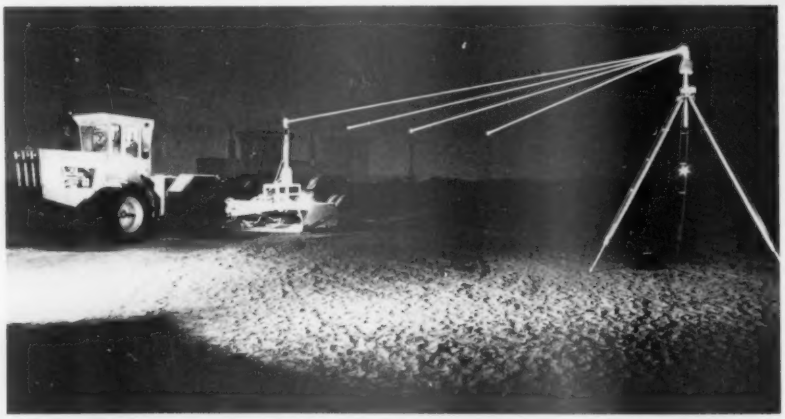
Through its special project office in Wellton, Ariz., SCS works directly with area farmers who sign contracts to develop and apply conservation plans that include cost-shared practices which will raise their irrigation efficiency.

"We are trying to raise irrigation efficiency to 80 percent on the 23,800 acres in SCS's onfarm project," said Harold Pritchett, SCS project leader. "The goal for the overall salinity con-

At right, Ronald McDonnell installed homemade "baffles" in his ditches to slow water rushing down a grade so that it could be more easily controlled for efficient irrigation.

Below, flood irrigation suits the soils and crops in the Wellton-Mohawk area, as in this field of young alfalfa.





Above, working around the clock, laser-guided earthmovers level fields to provide uniform distribution of irrigation water. Multiple exposures catch laser light beamed from a sending unit on a tripod to a receiver on the tractor-pulled scraper. At right, Robert and James Diller use laser-guided equipment to smooth fields before spring planting.

trol program is to raise average irrigation efficiency from 56 percent to 72 percent for all 65,000 irrigated acres in the Wellton-Mohawk area."

**Lining Ditches**

Most of the farms in the Wellton-Mohawk valley are flood irrigated. Under SCS's onfarm project, irrigation ditches will be lined with concrete and enlarged to carry 15 cubic feet per second or more. Concrete ports or turnouts will be installed on ditches to deliver water to the fields.

A critical depth flume to measure flow will be installed near each farm's turnouts from the Wellton-Mohawk Irrigation and Drainage District's canal.

John Klingenberg, a farmer in the Wellton-Mohawk valley who manages 650 acres of bermudagrass seed and wheat, began improving his irrigation system 5 years ago. "What we've gained under the salinity control program is engineering," he said. "Before, we didn't know how to improve irrigation efficiency.

"All the ditches on this farm were dirt. They were poorly engineered, and

At left, a critical depth flume will be installed at each turnout from the canal. Flumes have gages which are used to measure water flow. Below, unlined ditches will be lined with concrete to prevent seepage, reduce sediment, and discourage gophers from burrowing in the banks.

we had problems with gophers. Well-designed, concrete-lined ditches have cut the time, labor, and water for irrigation in half. That's a real plus to me. We're also saving on equipment and fertilizer.

"Properly leveled fields are also important to efficient irrigation," Klingenberg explained. "Otherwise, much more water is needed to flood high areas in a field." In addition, salt accumulates on high spots and inhibits plant growth.

**Leveling Fields**

Leveling is a key practice in the on-farm irrigation improvement project. Equipment with laser beam control is used to finish the leveling job, enabling farmers to make their fields nearly dead level.

"The laser beam is the greatest thing that ever happened to land leveling," said Robert Diller, another Wellton-Mohawk farmer. "Everybody will be using it in a few years, once people see what it can do."

The laser beam sending unit sits on a stationary tripod and turns at 5 to 10 revolutions per second. A receiver on the hydraulic scraper locks into the beam and adjusts the blade level automatically.

"An instrument man and five stake pounders couldn't keep up with this laser beam," Diller said.

Using laser equipment, Diller and his brother, James, leveled their fields to within one-half inch of zero grade. They'll use their laser equipment each spring to smooth the fields before planting summer crops.

"I can grow wheat okay in winter," Diller said, "but dead level fields are much better for summer crops. If fields aren't dead level, water stands in low spots and cotton gets rank and alfalfa scalds out."

"Well-designed, concrete-lined ditches have cut the time, labor, and water for irrigation in half . . . and have saved on equipment and fertilizer."

**Improving Systems**

Precise land leveling also is important to Ronald McDonnell, who manages 290 acres of alfalfa, small grain, and cotton.

Under the irrigation improvement program, McDonnell has streamlined his system on 64 acres on the narrow mesa along the southern boundary of the Wellton-Mohawk area. He has lined ditches and sized and leveled his fields. But his fields are not dead level. The 660-foot runs have 0.2 foot total fall so that water is "pushed" more rapidly to the low end of the borders.

"On the mesa, we think the slight fall works better than dead level because of the soil properties," McDonnell explained.

Mesa soils are sandy and well drained, and water penetrates quickly. If the fields were dead level, too much water would sink into the ground near the turnouts before enough reached the far end of the borders.

McDonnell used mechanical soil improvement along with leveling. He removed small areas of soil with poor water management properties and

filled the excavations with soils similar to those in the rest of the field.

When the crop is young, he can cover each 3-acre field with 1½ inches of water in only 15 minutes. He is equipping the system with an electric timeclock device and cylinders operated by air pressure that will open and close the turnout gates to irrigate the entire farm automatically.

"Some of the other farmers don't believe it," said McDonnell, "but this irrigation system is so efficient that if I turn the water off 1 or 2 minutes too soon or leave it on a minute or two too long, it makes a difference."

**Saving Water by Drip Irrigation**

SCS also is encouraging farmers to install drip irrigation systems in citrus orchards on the mesa where flood irrigation generally is less efficient than in the valley.

Project Leader Pritchett said that drip irrigation systems, which emit 1 to 4 gallons of water per hour at the base of each tree, are more efficient because the water is distributed directly to the plant roots and not over the open areas between the trees.

Robert Zeller, who farms 100 acres of orange, lemon, and grapefruit orchards on the mesa, was the first Wellton-Mohawk farmer to install a drip irrigation system.

Water from the Wellton-Mohawk Irrigation and Drainage District's canal is strained, filtered, and treated with sulphuric acid to remove algae and tiny organisms that would clog emitters. It flows through buried lines to spaghetti-type emitters—narrow plastic tubes—under each tree where it drips out slowly.

"Mature trees take 70 to 90 gallons a day in the summer," said Zeller. "That means the system will be running a maximum of 15 hours a day."

Although Zeller has had a few problems with clogged emitters, he cites many advantages of drip irrigation, including water savings.

"In 1975, we had a flood irrigation system for the orchards, and we used 13 acre-feet of water per acre. In 1976, we used only 6 acre-feet per acre, and the drip system was not completely installed. This year, I think we'll use less than 4 acre-feet of water per acre," he said.

"In 1975 with a flood irrigation system we used 13 acre-feet of water per acre . . . this year with drip irrigation, we should use less than 4 acre-feet."

**Meeting the Goal**

Since the project office at Wellton was staffed in 1975, SCS has received 129 applications for assistance under the irrigation improvement program. Contracts have been signed for improvements on 46 farms covering 7,500 acres. Farms with the lowest efficiency are given priority.

By the end of June 1977, 132,314 feet of ditches had been lined with concrete; 2,969 acres had been leveled; three drip irrigation systems, including pumping plants for water control, had been installed; and 1,393 structures for water control measurement, such as critical depth flumes, had been built.

SCS is evaluating the project by comparing the amount of water used on each farm before improvements are installed to the amount used after. Results as of June 30 indicate that on 865 acres of alfalfa, irrigation efficiency has increased to 85 percent; on 748 acres of cotton, to 97 percent; and on 1,004 acres of wheat, to 67 percent.

The Colorado River Basin Salinity Control Program's goal in the Wellton-Mohawk area is to reduce return flows by 35 to 40 percent a year by 1981, which, incidentally, will conserve 78,000 acre-feet of water a year. Accomplishing this goal will cut the Colorado River's annual salt load by half a million tons—a firm first step toward meeting the United States agreement with Mexico.

Mr. Williams is public information officer, SCS, Phoenix, Ariz.
Ms. Zack is a staff writer, Information Division, SCS, Washington, D.C.

Particle-free water is vital to drip irrigation. At far left, Robert Zeller scrapes off a strainer that cleans water from the irrigation district's main canal. The water will be filtered before it enters the drip system. Near left, a flow meter records the rate of flow and the cumulative amount of water entering Zeller's drip system.

Below, SCS Project Leader Harold Pritchett (left) and Ronald McDonnell discuss the farmer's improved irrigation system.

## Wellton-Mohawk Project

**The Soil Conservation Service's onfarm irrigation improvement project is part of a multiagency effort to reduce return flows from the Weliton-Mohawk area of Arizona. The Bureau of Reclamation, U.S. Department of the Interior, is leading the project under the Colorado River Basin Salinity Control Program, which was authorized in 1974 by Public Law 93-320 to meet the United States water quality treaty agreement with Mexico.**

**This law authorized the Bureau of Reclamation to build a desalinization plant near Yuma, Ariz., to treat return flows from the Wellton-Mohawk area. By reducing the return flows, the size and operating cost of the desalinization plant could be reduced.**

**Along with SCS's onfarm project:**

- **The Bureau is reducing total irrigable land in the Wellton-Mohawk area from 75,000 acres to 65,000 acres and is conducting an irrigation management service program. This includes, for example, using neutron probes to measure soil moisture.**
- **The Agricultural Research Service has set up a research station and demonstration plots near Tacna, Ariz., to study different irrigation systems, the timing of applications and amount of water needed for crops grown in the area, and the amount of water needed for leaching salt out of the root zone.**
- **The Cooperative Extension Service supports the salinity control program by conducting field demonstrations and distributing information.**

**In addition to Arizona, the 254,000-square-mile Colorado River Basin covers parts of California, Colorado, Nevada, New Mexico, Utah, and Wyoming. Farming areas in these states are also included in the salinity control program. SCS is studying six additional onfarm irrigation improvement projects in Colorado, Nevada, Utah, and Wyoming and is evaluating the need for 11 more studies in the Basin.**

by Thomas C. Gahm

A conservation district in south-central Minnesota has a special blueprint for communicating with farmers.

# Bringing People Face-to-Face with Conservation

Farmer Dick Hagen (right) speaks from experience about conservation. He chisel-plowed his cropland last year to prevent wind erosion and conserve moisture from winter snows. He and SCS technician Jody Bidinger examine the quantity of residue remaining on the surface.

"Conservation is an educational process," says District Supervisor Dick Hagen of the Renville County Soil and Water Conservation District (SWCD) in Minnesota. "The people who work the land are the only ones who can make conservation a reality."

According to Hagen, the way to make people want to practice conservation is to "bring people face-to-face with your product and get the neighbors talking about it." Communicate. Demonstrate. Make conservation something you can see.

Hagen follows this philosophy on his 80-acre farm. He follows it in his job as advertising manager for a large seed-corn company. He follows it, too, in his job as the Renville County SWCD public relations director.

Hagen has served on the district board for 2 years. He finds that farmers take three steps before they buy a new product or try a new practice: They read all they can about it; they talk to other farmers who have already tried it; and they go on field days to see it in action.

He said he feels that district people can best help farmers by keeping alert to new conservation developments and getting news of these developments to the people who can use them.

As an example, he cites the work of the Soil Conservation Service on agricultural waste management systems. "Before SCS was involved, farmers often bought systems that caused more problems than they solved. SCS people are helping by designing livestock management systems that are realistic and practical for the farmer."

The districts' responsibility, he says, is to help interested farmers act on their conservation needs. One way the Renville County SWCD does this is by publishing and distributing news articles and photographs about conservation practices.

They're succeeding. Until 2 years ago, farmers in the county constructed only two new wildlife ponds a year. Since then, reports SCS soil conservation technician Jody Bidinger, farmers have put in 10 times that many ponds each year. "Three years ago," Bidinger says, "only a handful of farmers in the county had feedlot pollution control systems. Now we're helping with about a dozen new installations a year."

The district is focusing on its 3-year-old program for planting trees as windbreaks and using mulch tillage. Hagen is promoting these practices because they help conserve moisture.

"In the next few years," Hagen predicts, "we will see a tremendous increase in the number of field windbreaks planted as wind barriers." The district expects to help farmers plant about 40,000 trees this year, double the number planted before the program began.

Hagen is also spearheading a district project to lease some land and, in cooperation with local implement dealers, establish a permanent location for demonstrating conservation tillage.

Hagen's own farm is a demonstration in conservation. His farmstead is lined by a 500-foot, five-row windbreak, and he intends to plant more trees. All of the cropland is chisel plowed. He says this form of mulch tillage helps build up soil moisture while cutting his operating costs. The farm also has a newly dug wildlife pond.

Hagen feels that the conservation selling job will continue for some time. He warns that: "As long as there is land that needs conservation treatment, conservationists cannot afford to stop talking about our product—or to stop demonstrating its effectiveness."

Mr. Gahm is public information officer, SCS, St. Paul, Minn.

# Ponds on the Palouse

by Claudia R. Aaker

When he first installed a pond on his farm in the Palouse country of northern Idaho, Walter Hellinger thought it was a good investment. He needed a livestock watering facility. He also wanted a spot where wildlife could find cover and where his family could enjoy fishing and picnicking.

That was 15 years ago. Today, Hellinger is retired from farming, but he still thinks his pond was a good investment. Wildlife continues to find refuge under the trees and shrubs, and the Hellinger family and friends fish for trout in the cool waters.

Hellinger was one of the first in his area to install a pond.

Now, conservation district officials and others in the water-hungry West are encouraging more farmers and ranchers to try farm ponds as emergency sources of water. Several of Hellinger's neighbors have followed his example. In Latah County, where the Hellinger farm is located, more than 600 ponds have already been installed, with 15 to 20 new ones being added every year.

Once he decided to install the pond, Hellinger received assistance from the Soil Conservation Service and the Latah Soil Conservation District (SCD) in planning and development. He located the pond in an area of his property where there were no trees and only an intermittent water supply.

Then, under a cooperative program with the Idaho Fish and Game Department through the Latah SCD, he obtained trees and shrubs to create wildlife habitat. Plantings were single rows of ponderosa pine, mountain ash, Nanking cherry, and caragana.

Hellinger later added a grassed waterway to filter the inflow of water, thus assuring better water quality and longer pond life. He also stocked the pond with trout.

When it was completed, the pond had become a special kind of oasis, surrounded almost entirely by grain and pea fields.

Its trees and shrubs are in full production. Ponderosa pine dominates the shoreline, casting a mantle of shade along the water. Birds feed on the Nanking cherry bushes, which also produce enough fruit for home canning. Many kinds of wildlife, including songbirds, find shelter in the dense growth.

At a time when the West's water supply is the lowest in many years, ponds like the one on the Hellinger property are becoming more attractive—esthetically and economically. Other uses for pond water include irrigation, fire protection, and field and orchard spraying.

Ms. Aaker is clerk-typist, SCS, Moscow, Idaho.

Swimming and boating are just two of the many activities Scouts enjoy at Lake Brooks.

by Henry W. Robertson

# Boy Scouts Are Cooperators, Too

The General Greene Scout Camp in Guilford County, N.C., has earned a reputation as a model campsite. Boy Scouts are working hard to keep that distinction by conserving the camp's natural resources.

Located on 500 acres of beautiful Piedmont woodland, General Greene Camp plays host to about 240 boys each week during the summer season. Another 3,000 campers enjoy the facilities in the fall, winter, and spring.

Most of the camp activities—swimming, fishing, and boating—center around Lake Brooks. This 30-acre manmade lake is part of a watershed covering more than 1,000 acres. Lake Brooks was constructed in 1928 by using mules and small dragpans. For more than 20 years, it was owned and used for summertime recreation by a successful attorney, A. L. Brooks, and his family. In 1951, Brooks and his wife donated 513 acres, including the lake, to the Boy Scouts.

Three-fourths of the original tract was in woodland and still is. In addition, the Scouts planted another 26 acres in pines. They also seeded 18 acres of permanent grass and planted 495 linear feet of grass field borders. Individual Scouts and troops continue to work on many conservation projects. They stabilize roadbanks, vegetate emergency spillways, install brush dams across eroding drainageways, and dig small diversion ditches to carry runoff water away from trails.

These projects serve two purposes: resource protection and conservation experience for the Scouts. Through them, the Scouts learn about rainfall, soil cover, floodwater retention, and sediment storage.

Lake Brooks is a good example of conservation in action. Within a short time after the Brooks family transferred the site to Scout management, the lake became threatened by both sedimentation and floodwaters. The Scouts turned for help to the Soil Conservation Service and the Guilford Soil and Water Conservation District.

They were given a soil map and a conservation plan that envisioned a miniature watershed project. The plan included small sediment and flood prevention dams on five tributary streams, along with land treatment and other measures. In 1968, when Guilford County joined with five other counties to organize the North Central Piedmont Resource Conservation and Development Area, the miniature watershed project became a reality. The last two dams were completed in 1973.

Since then, the camp has grown into a small community. It now offers a dining hall, medical facility, trading post, chapel, and amphitheater. The Scouts keep the camp running with good planning, hard work, and a sincere interest in resource conservation.

Mr. Robertson is district conservationist, SCS, Greensboro, N.C.

# Conservation Heals Road Scars

by Gene Warren

Top, SCS District Conservationist Wayne Stephenson observes roadside erosion typical of many roads in Caddo Parrish, La. Bottom, Stephenson looks at completed erosion control work and is joined by Garland Colvin, RC&D Coordinator, and Doris McWilliams and H. K. Smith, Caddo Parish Police Jury members.

Many of the 62 roads in Caddo Parish, La., are environmental eyesores. Many—but not all.

Forty-nine of them still bear erosion scars. Soil has been washed into culverts, streams, and ditches. Flooding often follows a heavy rain. Roadway maintenance is time-consuming and costly.

But 13 of these roads are different. They've been shaped, seeded, mulched, and fertilized under a measure sponsored by the Caddo Parrish Police Jury with assistance from the Soil Conservation Service. On 65 miles of roadway, erosion scars have been replaced by smooth and shady slopes of thick, green grass.

It all began 3 years ago, when the jury learned of funds and technical aid available through the Twin Valley Resource Conservation and Development (RC&D) Area. "We have had road erosion problems as far back as I can remember," said Jury President Wesley Browning, Jr. "When the Caddo Parish RC&D Committee came to us with this proposal, we thought it was worth a try."

Under the cost-share arrangement, the jury furnishes labor and equipment, while materials are purchased with RC&D funds. SCS provides technical and planning assistance.

This is a pilot project, and no decision has been made on whether to expand it. Yet sponsors have little doubt about the value of what has already been done.

Tommy Stinson, chairman of the Upper West Red River Soil and Water Conservation District, agreed, "It sure helps pave the way for a better environment."

Mr. Warren is public information officer, SCS, Alexandria, La.

# Conservation Districts and 208 Water Quality Management

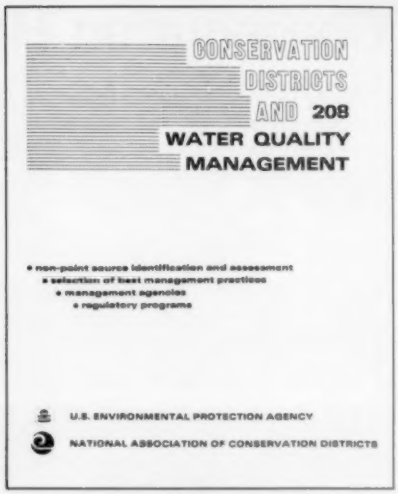
The overall objective of the Federal Water Pollution Control Act Amendments of 1972 is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters" by 1985. An interim goal is to make the water "fishable and swimmable" by 1983.

Section 208 of the Act is the basic tool for meeting these goals. Under it, each state must determine effluent limitations to meet water quality standards—at least to maintain the existing water quality—and to develop and carry out management programs to reduce pollution.

The National Association of Conservation Districts (NACD) has prepared "Conservation Districts and 208 Water Quality Management" to help conservation districts, state and areawide 208 planners, state water quality agencies, and state soil and water conservation agencies develop water quality management plans.

The comprehensive handbook discusses nonpoint sources of pollution, best management practices (BMP's), management agencies that will be responsible for carrying out water quality management plans, and regulatory programs. It emphasizes erosion and sediment control, animal waste management, and irrigation water management.

The handbook includes photographs, charts, tables, and appendixes




and examples of BMP's, pertinent regulations, agreements between conservation districts and cooperating agencies, and standards and specifications for conservation practices.

At the back of the publication is a step-by-step guide suggesting a task force approach for developing a nonpoint source pollution control program on the state and local level.

NACD prepared the handbook under a grant from the U.S. Environmental Protection Agency and was assisted by private organizations and government agencies including the Soil Conservation Service and other USDA agencies and the Bureau of Land Management.

As illustrated in the handbook, a diversion keeps clean runoff away from feedlot, and a waste storage pond behind diversion traps feedlot runoff. Both are examples of conservation practices used to protect water quality.

# Reviews

**Black Walnut for Profit, A Guide to Risks and Rewards.**

Bruce Thompson. 1976. Walnut Press, Scottsdale, Ariz. 285 pp., illus. $10.70; $8.70 paper.

This informative and useful reference book on the black walnut industry will interest anyone involved in growing walnut trees or selling the nuts and timber.

It discusses every phase of growing walnuts including methods of cultivation and protection against diseases and insects. Bruce Thompson describes the history and economics of the walnut industry and tells what he sees as the prospects of raising black walnut trees for timber.

He collected his information by consulting experts in the field, looking at research results, and drawing on his experiences in the walnut industry. Where pertinent, Thompson included brief research papers in the text.

Each chapter deals with one phase of growing walnuts. The chapters are arranged in order beginning with planting and proceeding to harvesting and selling the products. Numerous photographs, charts, and tables illustrate the text.

— Robert E. Hartung, forester, Northeast Technical Service Center, SCS, Broomall, Pa.

**A Valley Renewed.**

Hal Jenkins. 1976. The Kent State University Press, Kent, Ohio. 206 pp., illus. $5.75.

"A Valley Renewed" is a detailed history of the Muskingum Watershed Conservancy District. It is an account of local, state, and federal agencies and organizations cooperating to build one of the first major flood protection projects in the United States.

Hal Jenkins, the Muskingum District's public information officer from 1935 to 1939, tells how the series of dams has saved lives and money by controlling flooding in the Muskingum Valley, one of Ohio's largest watersheds, and by reducing flooding down the Ohio River. He also discusses how the project contributed to the development of our present-day flood protection program.

In this interesting narrative the author emphasizes that the Muskingum project also marked the beginning of planning watershed programs with more than flood protection in mind. It is a major recreation area covering 52,000 acres including 10 permanent lakes. The dams were designed with the capacity to supply water for the increasing needs of a growing population.

—Ralph C. Wilson, recreation specialist, SCS, Washington, D.C.

# Meetings:

July

1–4 Izaak Walton League of America, Atlanta, Ga.

14 Forage Legume Conference, Ardmore, Okla.

16–20 American Association of Nurserymen, Inc., Convention, Seattle, Wash.

23–27 National Association of Counties, Detroit, Mich.

24–28 National Federation of Business and Professional Women's Clubs, Inc., Louisville, Ky.

25–28 The Fertilizer Institute Trade Fair and Fertilizer Conference, Kansas City, Mo.

31–
Aug. 3 American Agricultural Economics Association, San Diego, Calif.

August

7–10 Soil Conservation Society of America, Richmond, Va.

15–18 National Farm and Power Equipment Dealers Association, St. Louis, Mo.

17–19 Highway Geology Symposium, Rapid City, S. Dak.

21–26 American Institute of Biological Sciences, East Lansing, Mich.

September

6–9 Hardwood Plywood Manufacturers Association, Seattle, Wash.

13–16 Editorial Writers Conference, Calgary, Alta., Canada

19–22 North American Forest Lands at Latitudes North of 60° Symposium, Fairbanks, Alaska

25–29 American Society of Landscape Architects, Minneapolis, Minn.

25–29 Farm and Industrial Equipment Institute Convention, Hot Springs, Va.

25–29 International Grain and Forage Harvesting Conference, Ames, Iowa

28 Clean Community System National Seminar, Keep America Beautiful, Inc., Washington, D.C.

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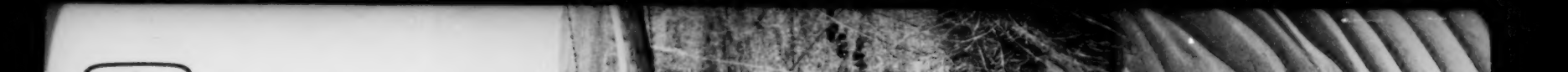
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